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ESTIMATE OF HUNGARIAN COAL RESERVES AND COAL PRODUCTION TRENDS

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(Summary of a lecture given at a special meeting of the Committee on Mining of the Hungarian Academy of Science on 10 December 1951)

The last official estimate of Hungarian coal reserves was made on the basis of conditions existing on 31 December 1948. Another estimate was recently completed by experts sent out to the coal-mining areas by the Ministry of Mining and Power. The recent estimate, which also makes allowance for the amount of coal mined since the above date, shows only a slight deviation from the previous figures. The statistics of the National Planning Office have been drawn up on the basis of this latest data. According to these statistics, which show the different types of coal, their weight, and their calorific value, Hungarian coal reserves present the following picture:

Reserves of Extractable Coal

Type or Coal Bed	Percent of Total Weight	Average Calorific Value (cal/kg)	Percent of Total Recoverable Calories
Lignites	27.4	1,940	16.0
Brown coals	49.5	3,380	50.4
Borsod coal bed	35.9	3,320	36.0
Salgotarjan coal bed	4.1	3,400	4.2
Central Transdanubian coal bed	9.5	3,560	10.2

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Type or Coal Bed	Percent of Total Weight	Average Calorific Value (cal/kg)	Percent of Total Recoverable Calories
Good-quality brown coals	12.5	4,265	16.1
Dorog coal bed	4.4	4,200	5.5
Tatabanya coal bed	8.1	4,300	10.6
Black coals	10.5	5,500	17.5
Average		3,317	

Since a considerable increase in estimates of Hungarian coal reserves is expected, particularly for black coal, good-quality brown coal, and other brown coals, I shall deal only with the data based on scientific research conducted in the northern part of the Mecsek and in the central Transdanubian Mountains. An increase in estimates of the Vas and Zala lignites is also expected, although the calorific value of these has little influence on the over-all coal reserves.

The increase in coal production between 1938 and 1951 can be broken down on a quantitative and a qualitative basis as follows:

Percentages of Various Types of Coal in Total Annual Production

Year	Black Coal	Good-Quality Brown Coal (Tata-Dorog beds)	Other Brown Coals	Lignites
1938	11.1	39.0	43.8	6.1
1939	10.4	39.3	44.8	6.0
1940 - 1945		(No data)		
1946	11.4	36.5	47.3	4.8
1947	12.0	36.3	45.2	6.5
1948	11.7	37.2	45.0	6.1
1949	11.6	36.9	45.2	6.3
1950	10.6	35.9	45.8	7.7
1951	10.8	33.0	45.9	10.3

By studying the qualitative distribution of coal production in the preceding table it can be established, even without statsitics for the years 1940 - 1945, that the black coals and the good-quality brown coals have shown a tendency to decrease, that other brown coals show practically no changes, and that the output of lignites has increased by 70 percent since 1938.

The following table shows the qualitative distribution by types of coal production on a calorific basis in the years 1938 - 1939 and 1946 - 1951.

Percentages of Calorific Output of Various Types of Coal in Total Annual Calorific Output

Year	Black Coal	Brown Coals			Average Calorific Value (cal/kg)
		Good Quality	Other	Lignites	
1938	14.5	44.7	38.0	2.8	4,272
1939	13.7	45.3	38.3	2.7	4,249
1946	16.2	40.4	41.0	2.4	3,863
1947	16.8	41.3	38.8	3.1	3,960
1948	16.5	42.3	38.3	2.9	3,950
1949	16.1	41.8	39.1	3.0	3,993
1950	14.7	41.3	40.0	4.0	3,897
1951	15.3	38.6	40.6	5.5	3,805

Here again the black coals and the good-quality brown coals show a tendency to decrease in contrast with the tendencies to increase of other brown coals and lignites. Similarly, average calorific value has decreased due to the increased production of brown coals and lignites.

The following table shows the amount of investment per heating unit and per ton required for expansion and maintenance of the production of coals of various qualities.

Investments per Unit (Ton and Million Calories) for Maintainance and Expansion of Coal Production

Coal of Calorific Value (cal/kg)	Results	
	Forints per Ton	Forints per Million Cal
1,500 - 2,000	--	--
2,000 - 2,500	45.1	21.4
2,500 - 3,000	22.1	8.0
3,000 - 3,500	52.9	16.1
3,500 - 4,000	35.1	9.6
4,000 - 4,500	260.0	63.0
4,500 - 5,000	71.5	15.6
5,000 - 5,500	51.1	10.0
5,500 - 6,000	224.0	39.1
Average	54.3	14.2

The foregoing table shows with striking clarity that the sums allotted for the expansion of production brought the least favorable returns in the case of coals in the 5,500-6,000 calory range, whereas the results were excellent in the case of brown coals, especially high-grade brown coals.

Average Analyses of Hungarian Coals (in percent)
(as received basis)

	Calorific Value (cal/kg)	Ash	Moisture	Fixed Carbon	Volatile	Fixed Carbon Plus Volatile
Petofibanya	1,750	23	43	14	20	34
Varpalota	2,200	9	47	23	21	44
Borsod	3,200	19	28	27	26	53
South Nograd	3,400	37	13	29	21	50
Kisterenye	3,250	29	19	39	22	52
Ajka	3,550	17	27	31	25	56
Dorog	4,350	20	14	35	31	66
Tatabanya	4,850	12	16	37	35	72
Komlo	5,300	24	6	59	11	70
Meszhart (Pecs)	5,400	20	7	64	9	73

Weight of Coal and Mining Cost

	Kg of Coal Required for 5,000 Cal	Mining Cost of 5,000 Cal (fillers)	Average Production Cost (forints per ton)
Petofibanya	2.86	24.6	86
Varpalota	2.27	12.3	54
Borsod	1.56	14.5	93
South Nograd	1.47	10.7	73
Kisterenye	1.54	16.9	110
Ajka	1.41	12.1	86
Dorog	1.5	11.3	100
Tatabanya	1.03	8.2	80
Komlo	0.94	14.1	150
Meszhart (Pecs)	0.93	12.4	133

In planning the utilization of good-quality brown coals for the period to 1959 inclusive, the following values have been considered:

Good-Quality Brown Coal in Percent of Over-All Production

1952	21.60
1953	19.60
1954	17.50
1955	16.40
1956	15.80
1957	15.30
1958	15.10
1959	15.00

Although the percentage of high-grade brown coal in the total is decreasing, it can be assumed from the general increase in over-all production that considerably more high-grade brown coal will be mined. By 1954, a 20-percent increase is expected, and in 1959 65 percent more good-quality brown coal is to be produced than in 1951. The slate coals /bituminous shales?/ are not included in this estimate.

The most important power-producing items of Hungarian heavy industry, such as metallurgical coke, generator gas, domestic coke, briquettes, and gas, require great quantities of high-grade brown coal from the mining industry. Therefore, black coal and good-quality brown coal must be made available to meet the requirements of heavy industry.

Incidentally, if sulfur could be recovered from gas derived from coal, sulfur imports could be cut considerably.

Certain steps have been taken to utilize a combination of types of coal in the form of coke, but so far experiments have failed to produce the mixture of Komlo coal which lends itself best to coking.

Domestic coal production was not able to fulfill the increased requirements of industry in the past plan period. In 1951, coal production amounted to only 95.3 percent of the plan. This figure means a 4.7-percent deficit in the quantity of coal produced and a 5.2-percent deficit in the calorific output.

The Coal Mining Division of the Ministry of Mining and Power sent its first plan for fuller exploitation of good-quality brown coal to the National Planning Office in March 1949. A second plan was drawn up and transmitted to the Committee on Mining of the Hungarian Academy of Sciences on 16 January 1951.

If the estimated production of the First and Second Five-Year Plans and the amount of good-quality brown coals to be extracted during that period are considered, it can be assumed that the total calorific reserves of good-quality brown coals, which are 16.1 percent at present, will suffer only a 0.4-percent decrease in the next 10 years.

Investments aiming at an increase in capacity have brought good results in good-quality brown coal. The figures are advantageous also from the point of view of production cost per 5,000 calories. Mining costs were: for Matra lignite, 2.86 kilograms of coal giving 5,000 calories cost 24.6 filler; for Varpalota lignite, 2.27 kilograms of coal giving 5,000 calories cost 12.3 filler; for Dorog good-quality brown coal, 1.15 kilograms giving 5,000 calories cost 11.3 filler; and for Tata good-quality brown coal, 1.03 kilograms giving 5,000 calories cost 8.2 filler.

The advantageous figures in the case of Varpalota lignite are due to the fact that mining is at present conducted on the upper seam. The lower seam, which is considerably more difficult to mine, is as yet untouched.

The production costs of the Matra and Varpalota lignites are 86 and 54 forints per ton; those of the basic coals, Dorog and Tata coals, 100 and 80 forints per ton respectively. The increased utilization of good-quality and other brown coals will also mean great savings for the industrial plants.

I want to suggest certain procedures to be followed by our mines. At present, there are 93 mines with the following capacities:

Carloads per Day	1950	1951
Up to 10	2	3
10 - 25	27	12
25 - 50	31	28
50 - 75	17	16
75 - 100	9	14
Over 100	7	20
Total	93	93

These figures show the general line of last year's trend, that is, either abandonment or enlargement of small plants and further enlargement of medium-sized and large plants. The objective should be to turn the small plants into medium-sized plants and the medium-sized plants into large ones. This policy of reorganization would allow the kind of concentration a large-scale production requires.

A further goal for the coal industry is the introduction of certain carefully worked out and proved Soviet methods, which include plans for production and investment as well as technical and labor improvements.

There has been a trend toward a manpower shortage in the coal industry; therefore, everything possible must be done to increase labor's efficiency through reorganizations such as the cyclic method and the introduction of certain technical improvements. Furthermore, in 1951 there was a 300,000-ton deficit in the largest good-quality brown coal plant which meant serious difficulties in certain branches of the economy.

The above-described conditions made it necessary to overcome the estimated shortages in quantity and in calorific value in the next plan period by establishing mines which will be short lived (3 to 6 years), great in capacity, and which will mine near the surface. This will enable the elimination of unsatisfactory conditions existing in the coal industry and allow necessary improvements to be made through research work and reorganization of plants.

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